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Odor Report (1950)

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ANDROSCOGGIN RIVER STUDIES

ANNUAL REPORT

1950

by

Walter A. Lawrence

Lewiston, Maine
November, 1950

Index.

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Summary

1. During the summer of 1950 Androscoggin river odor intensities were lower and more acceptable than at any time since observations were begun in 1943.

2. Natural conditions were more favorable than those which prevailed in some other years.

3. Odor intensity in the vicinity of the two power Dams was, at times, objectionable.

4. For the first time in a decade the Lewiston newspapers have not printed any complaints concerning the river odor.

Lewiston, Maine
November, 1950

FINAL REPORT ON THE ANDROSCOGGIN RIVER ODOR in the LEWISTON-AUBURN AREA 1950

Introduction. Daily observations of Androscoggin River odor were begun on June 16 and continued through September 28, 1950. The daily reports are numbered one to one hundred and five inclusive.

The form of this final report, station locations, odor terms and intensities are the same as those employed each year since 1943.

The very favorable low odor intensities recorded in downtown Lewiston and Auburn were due to:

a. larger river flows than those of the last two years;
b. somewhat lower and more nearly average normal temperatures of the water and air than those which were recorded during 1949; and
c. a more liberal use of sodium nitrate.

However, production of sulfite pulp this summer was larger than the output for the 1949 season.

Daily Report Data. The daily reports record data on:

a. air temperature at Station #6
b. weather conditions
c. direction of the wind
d. water passing over the Lewiston Falls
e. depth color of the river water
f. river water surface conditions
g. types of odor originating from the river water
h. intensities of the river odor in the air
i. some reports contain statements relating to conditions at Deer Rips and Gulf Island Dams

Odor Observation Stations. No changes were made in the location of the eight odor observation stations located in Lewiston and Auburn.

Air Temperatures. The air temperature recorded in the daily reports was that existing at Station #6 in Lewiston, usually at the time odor observations were begun. These temperatures may vary one or two degrees plus or minus from the official Weather Bureau Station located down-town.

The official mean hourly air temperatures for 1941 through 1950 for June, July, August and September are recorded in Table #1.

Table #1

MEAN HOURLY AIR TEMPERATURES

Year	June	July	August	September
1950	64.15	68.90	66.03	55.15
1949	66.6	71.6	69.9	58.7
1948	60.0	70.5	69.9	61.2
1947	60.9	71.1	70.4	60.8
1946	63.6	67.9	64.7	61.4
1945	62.1	68.2	67.7	61.5
1944	63.5	69.8	72.6	60.7
1943	65.0	70.3	66.1	57.7
1942	64.7	68.8	68.2	60.7
1941	65.8	69.9	65.8	60.7
65 year average	63.15	68.88	66.69	59.10

This year June temperatures were one degree above the 65 year average but were 2.5 degrees lower than 1949. July air temperatures were equal to the 65 year average, but the August readings were about 0.65 degree lower than the long term average, and almost four degrees lower than the 1949 recordings. September was unusually cold, four degrees below the 65 year average and 2.6 degrees below any year recorded in

Table #1. The summer of 1950 was notable for the frequent marked difference between daytime maximum temperature and night minimums.

Rainfall. Precipitation during the summer of 1950 was again sub-normal, thus extending the dry cycle into the fourth successive year. The combined June, July, August and September totals are 5.3 inches below the seventy-five year average.

Table #2

Rainfall (inches)
Lewiston, Main Street Gate House

Year	June	July	August	September
1950	3.14	0.93	3.71	1.44
1949	1.52	1.13	1.96	4.07
1948	3.89	1.50	2.04	0.91
1947	4.07	5.89	0.70	2.75
1946	1.59	4.59	7.30	4.65
1945	5.39	3.18	2.46	2.49
1944	5.25	3.99	1.43	6.29
1943	3.11	4.04	4.63	1.63
1942	6.54	2.92	1.09	2.82
1941	0.78	3.97	1.72	0.95
75 year average	3.40	3.50	3.03	3.52

Fortunately the rainfall in the storage areas was larger than in the Lewiston area, thus making possible the release of more water than would have been wise under conditions such as existed in the lower valley areas.

Direction of Wind. More northerly winds were recorded this summer than usual. Such winds may bring

any odor which exists over the pond nearer to certain residential areas of the two cities.

Water Flowing over the Lewiston Falls. The volume of water allowed to pass over the Falls is an important factor in the odor intensity in that region when hydrogen sulfide or pig-pen is present in the water in appreciable amounts. During 1950 neither constituent was present in sufficient quantity to give rise to objectionable odor intensities even at times when large volumes of water were being spilled over the Falls. For this reason the usual tabulation of data under this heading has been omitted.

Color of the River Water. The "depth" color of the river water changed from brownish to blackish on July 26 and the water appeared to retain this color through the remainder of the season. The change occurred about a week earlier this year than in 1949. The cause of this change was described in the 1949 report.

River Surface Conditions. The foam produced by mechanical agitation or by the passage of the water over rocks was not of the very persistent type, and usually did not leave very much scum to collect along the relatively quiescent sections of the river. Most of the scum was brownish in color; black scum was not observed in 1950.

Floating sludge was not seen south of Gulf Island Dam and as its presence in that area has not been

reported since 1944 it may be assumed that conditions have been improved to the extent that its reappearance is unlikely.

Blue-Green Algae and Vorticella. This summer blue-green algae were seldom observed and then only in unimportant amounts. The larger use of sodium nitrate this year did not appear to have any influence on their growth. The limiting factor on their growth may be the color of the water which absorbs much of the light so essential to their growth.

Vorticella-zoogleal masses appeared on the submerged rocks just south of Gulf Island Dam sometime during the second week of August and remained until about mid-September. The area covered was small compared with that of some previous years.

Odor Intensities. No change was made in the system employed for reporting the intensity of the river odor. The descriptive terms and their numbers are:

0.	no odor	3.	distinct
1.	very faint	4.	decided
2.	faint	5.	very strong.

In the down-town areas the odor intensities were usually very low and at no time observed to be objectionable. The intensity pattern was surprizingly similar to that of last year in spite of different weather conditions. The larger volume of river flow during the critical months and the use of sodium nitrate made possible increased pulp production without a noticeable increase of odor intensities.

TABLE #3

ODOR INTENSITY FREQUENCIES
1943 THROUGH 1950
DAYS PER MONTH

	Intensity #1								Intensity #2							
	50	49	48	47	46	45	44	43	50	49	48	47	46	45	44	43
Station #1																
June	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
July	0	0	0	0	2	0	3	6	0	0	0	0	0	0	2	2
August	0	0	0	1	0	1	2	2	0	0	0	0	0	0	1	0
Sept.	0	0	0	2	2	1	1	0	0	0	0	0	1	0	0	0
Station #2																
June	11	10	10	17	8	14	8	4	1	4	2	2	9	8	11	12
July	29	28	11	17	1	13	12	1	2	3	20	9	22	14	10	22
August	26	23	18	1	7	1	0	0	4	8	13	13	17	20	11	23
Sept.	14	16	23	2	12	12	5	6	2	0	7	27	13	14	18	18
Station #3																
June	9	6	9	12	5	6	2	0	3	8	3	6	8	17	14	9
July	12	15	3	12	1	9	5	1	7	16	23	13	6	18	10	21
August	22	14	9	0	7	2	0	2	8	17	22	9	9	20	8	23
Sept.	16	15	16	3	12	9	3	0	5	7	14	13	11	14	18	24
Station #4																
June	5	10	10	17	8	13	4	5	8	4	2	2	10	9	13	9
July	22	24	10	16	2	14	11	1	8	7	19	9	19	12	9	4
August	21	24	15	1	4	1	0	0	8	7	16	10	14	17	1	20
Sept.	13	16	15	1	10	12	5	1	1	2	11	9	13	14	12	23
Station #5																
June	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0
July	3	0	0	0	2	2	4	1	0	0	2	1	4	0	3	2
August	0	0	6	2	1	0	1	0	0	0	0	5	3	0	10	1
Sept.	0	0	0	0	1	0	1	1	0	0	0	4	2	1	3	1
Station #6																
June	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
July	1	0	0	0	1	0	0	0	1	0	0	0	1	0	4	2
August	2	0	2	0	0	0	0	0	1	2	1	2	3	1	5	3
Sept.	0	0	0	0	1	0	0	0	0	0	0	1	1	1	4	0
Station #7																
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	2	0	0	1	0	0	0	0	0	0	1	1
August	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Sept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Station #8																
June	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
July	0	0	0	0	2	0	0	1	0	0	0	0	1	0	1	0
August	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0
Sept.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE #3A

CDCR INTENSITY FREQUENCIES
1943 THROUGH 1950
DAYS PER MONTH

Intensity #3								Intensity #4								
50	49	48	47	46	45	44	43	50	49	48	47	46	45	44	43	
																Station #1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	July
0	0	0	0	0	0	5	1	0	0	0	0	0	0	0	0	August
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.
																Station #2
0	0	0	0	0	0	3	1	0	0	0	0	0	0	0	0	June
0	0	0	2	8	2	7	10	0	0	0	0	0	0	5	0	July
0	0	0	16	6	9	17	5	0	0	0	0	0	2	9	0	August
0	0	0	1	4	2	5	3	0	0	0	0	0	0	0	0	Sept.
																Station #3
0	0	0	1	3	1	7	8	0	0	0	0	2	0	0	1	June
2	0	4	5	22	1	12	12	0	0	0	0	2	1	7	3	July
0	0	1	12	13	9	21	4	0	0	1	3	1	2	11	3	August
0	0	0	12	6	3	12	6	0	0	0	2	0	0	0	0	Sept.
																Station #4
0	0	0	0	0	1	5	5	0	0	0	0	0	0	5	5	June
0	0	0	3	29	3	8	28	0	0	0	0	0	0	19	3	July
0	0	0	12	11	13	19	9	0	0	0	6	1	2	4	1	August
0	0	4	18	4	2	14	4	0	0	0	2	0	0	0	0	Sept.
																Station #5
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	3	0	1	3	0	0	0	0	0	0	0	1	July
0	0	0	1	0	1	3	1	0	0	0	0	0	0	0	2	August
0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	Sept.
																Station #6
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	1	0	2	3	0	0	0	0	0	0	2	2	July
0	0	0	0	0	6	12	3	0	0	0	0	0	4	10	0	August
0	0	0	0	3	3	8	0	0	0	0	0	0	0	0	0	Sept.
																Station #7
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	July
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	August
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.
																Station #8
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	June
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	July
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	August
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Sept.

Comparison of odor intensity numbers in Table #3 enables one to arrange the years in order of decreasing odor as 1944, 1947, 1943, 1946, 1948, 1949 and 1950. However, the difference between 1949 and 1950 is not appreciable.

General Odor Coverage. There was no wide-spread odor originating from the water in the down-town areas. Odor from the two dams and the pond was recorded at Station #6 on five different days during the summer. Owing to the shut-down of the automatic power plant at Deer Rips for repairs and also to other unusual operations there, depth water was frequently spilled through the control gates. This spilling produced considerable agitation of the water and the liberation of odor. Fortunately the odor usually did not spread over a large area, but in the Deer Rips locality it was observed more frequently than would normally be experienced. The houses nearby did not show any discoloration of paint attributable to river odor.

Table # 4

GENERAL ODOR COVERAGE DATA
1950

Date	Highest Intensity*	Type	Time Period
July 20	#2	H.S.	Late evening
21	#1	H.S.	Late evening
Aug. 11	#1	H.S.	Early morning
14	#1	H.S.	Early morning
22	#2	H.S.	Intermittent. Late evening and early morning.

*at Station #6

TABLE #5

GENERAL ODOR COVERAGE
1943 THROUGH 1950
(NUMBER OF DAYS AND HIGHEST INTENSITIES AT STATION #6)

Month	1950 days	Highest Intens.	1949 days	Highest Intens.	1948 days	Highest Intens.	1947 days	Highest Intens.
June	0	-	2	1 #2 1 #3	0	-	0	-
July	2	1 #1 1 #2	0	-	4	1 #1 1 #2 2 #3	0	-
August	3	2 #1 1 #2	3	2 #2 1 #3	12	1 #1 8 #2 3 #3	13	7 #3 6 #4
Sept.	0	-	0	-	4	2 #2 2 #3	10	1 #2 7 #3 2 #4
Total Days	5		5		20		23	

Month	1946 days	Highest Intens.	1945 days	Highest Intens.	1944 days	Highest Intens.	1943 days	Highest Intens.
June	0	-	0	-	0	-	0	-
July	8	1 #2 7 #3	0	-	5	1 #2 2 #3 2 #4	6	4 #3 2 #4
August	6	1 #2 2 #3 3 #4	7	3 #3 4 #4	15	1 #2 5 #3 8 #4 1 #5	6	2 #2 3 #3 1 #4
Sept.	7	1 #2 4 #3 2 #4	4	1 #2 3 #3	8	2 #2 6 #3	0	-
Total Days	21		11		28		12	

Odor Types. Pig-Pen. The decrease in the frequency of appearance of this odor which began last year continued through the summer of 1950. Although almost always present in the pond area, especially north of mile two, the potency is such that when the water has passed the Dams the odor is often not recognizable as pig-pen. Pig-pen was identifiable on 36 days in 1950, 34 days in 1949, but 76 days in 1948. The highest intensity observed on the down-town bridges was #2.

Hydrogen sulfide. This odor was not identified on any of the daily visits to the down-town observation stations. However, this compound was the principal, if not sole, constituent of the wide-spread odor which appeared on five different days at Station #6.

The concentration of hydrogen sulfide in the water in the pond and water passing the Gulf Island Dam varies widely during the day. Analyses made at one hour may and frequently do differ markedly from those made on water sampled a few hours later. For this reason the odor in the region of the power houses frequently varies between wide limits; the peak is usually attained when starting up the generators in the early morning after the usual night shut-down.

Musty. This odor was the dominant one in the down-town sections of the river. Only very seldom was it observed more than a hundred feet from the water and it was not present at objectionable intensities.

Other odors. Occasionally odors of other types

TABLE #6

FREQUENCY OF RECORDED ODOR TYPES 1943 THROUGH 1950 DAYS PER MONTH.*

Type of Odor	50	49	48	47	46	45	44	43	50	49	48	47	46	45	44	43
				June								July				
Pig-pen	0	2	1	10	17	18	17	0	13	15	29	26	25	24	26	13
Hydrogen sulfide	0	0	0	0	0	0	2	0	0	0	8	0	18	0	14	13
Moldy	3	9	5	5	5	11	4	5	2	4	6	1	4	11	0	0
Musty	9	3	2	8	4	0	11	8	20	18	0	0	1	3	2	27
Earthy	1	1	0	0	0	6	0	17	5	0	0	0	1	4	0	10
Sulfite	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	1
Fishy	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
Sour	0	0	0	2	3	1	0	0	1	0	0	0	5	7	1	0

Type of Odor	50	49	48	47	46	45	44	43	50	49	48	47	46	45	44	43
				August								September				
Pig-pen	21	17	24	13	20	21	30	13	2	0	22	26	21	11	22	11
Hydrogen sulfide	0	1	16	19	17	20	30	16	0	0	12	24	10	4	15	13
Moldy	1	5	2	3	7	12	9	1	3	1	5	3	2	19	10	0
Musty	18	17	2	0	5	0	3	28	17	21	5	4	4	2	4	24
Earthy	4	2	0	0	0	3	0	0	1	0	0	0	0	2	0	0
Sulfite	0	0	0	0	0	0	3	5	0	0	0	0	1	1	0	0
Fishy	0	0	0	0	2	1	0	1	0	0	0	0	1	1	7	0
Sour	0	1	0	1	1	5	0	0	0	0	0	3	0	5	0	1

Type of Odor	50	49	48	47	46	45	44	43
				TOTALS				
Pig-pen	36	34	76	75	83	74	95	37
Hydrogen sulfide	0	1	36	43	45	24	61	42
Moldy	9	19	18	12	18	53	23	6
Musty	64	59	9	12	14	5	20	84
Earthy	11	3	0	0	1	15	0	27
Sulfite	0	0	0	2	1	1	3	6
Fishy	1	0	0	0	4	3	7	1
Sour	1	1	0	6	9	18	1	1

* Not including Table #5 data

were present but not at intensities which would give rise to complaint. These types do not form an important part of the odor pattern.